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EVE'S APPLE, OR THE FORBIDDEN FRUIT.

THE FORBIDDEN FRUIT,
OR, EVE'S APPLE TREE OF CEYLON.

THE island of Ceylon is situated between the sixth and tenth parallels of North latitude; winter is consequently unknown, and it enjoys a summer which may be styled perennial. The richness and variety of its natural productions are indescribably great, though it is remarkable that the soil of the country contains a very small proportion of vegetable matter; a fact attributable, probably, to the high temperature of the climate*, which produces rapid decomposition, and to the heavy rains which prevent its accumulation. The soils, according to Dr. Davy, are derived from the decomposition of gneiss, of granitic rock, or of clay iron-stone; and in many cases, quartz constitutes more than nine-tenths of the whole. Of this the principal cinnamon-garden, in the neighbourhood of Colombo, is a singular instance; in many places the surface of the ground is as white as snow, being a pure quartz-sand: a few inches below the surface, where the roots of the plant penetrate, it is of a gray colour, and, upon being analyzed, was found to consist of more than ninety-eight parts of siliceous sand, to one part of vegetable matter. It would appear, therefore, not a little surprising, that cinnamon should succeed best on so poor a soil, but this success is attributable to the operation of other circumstances.

The peculiarities of the climate of Ceylon cause its productions to differ very much on the opposite coasts; the Palmyra-tree (*Borassus flabelliformis*), for instance, which is extensively cultivated on the northern side, is hardly to be met with on the south; while, on the contrary, the Coco-tree, (*Cocos nucifera*), which forms a sort of continuous garden in the south, cannot be grown on the north: in fact, all vegetable productions requiring a moist soil succeed best on the south-west side, and those requiring a dry one, on the north and north-east sides of the island. The seeds of all European plants degenerate very much, and, in a few years, yield but very indifferent returns: to preserve the quality, the importation requires to be renewed almost every year; but some of the indigenous plants flourish with wonderful vigour.

Dr. Davy remarks, that the geology and mineralogy of Ceylon, have not yet received that attention which their importance demands; the same observation is fairly applicable to the other branches of the natural history of this beautiful and valuable possession of the British Empire. We are thus unfortunately precluded from giving any very detailed description of the botanical curiosity, of which we this week present an engraving, executed from original drawings, kindly furnished to us with that view, by the Right Hon. Sir Alexander Johnston, who, while inquiring into the history of the island, had drawings made of a great many of the trees, plants, and other vegetable productions, to which any religious, political, or moral interest was attached by the native Hindús, Buddhists, Mohammedans, or early Christians. To that gentleman is to be ascribed, amongst other plans for the improvement of the island of Ceylon, and the developement of its resources, the suggestion, in the year 1810, of establishing a botanical garden near Colombo, which was accomplished, and of having the Linnean system translated into the Singhalese and Tamul languages, and some of the

* The following results are given by Dr. Davy as the annual mean temperature at the different places indicated, viz.,

Trincomalé, on the N.E. coast.....^{80° 4'}

Colombo, on the S.W. coast.....^{79° 0'}

Kandy, in the interior.....^{73° 5'}

The summit of Adam's Peak, about 7000 feet above the sea, varied from 51° at 9 P.M., to 59° at 7 A.M., in April, 1817.

ablest of the natives regularly instructed in botany. We are indebted to Mr. Moon, the late superintendent of the garden, for having arranged, according to that system, a valuable catalogue of Ceylonese plants, in the English and Singhalese languages.

The subject of our sketch occurs in this catalogue, as the *Tabernamontana dichotoma* of the *Hortus Kewensis*. Its native name is *Diwi Kaduru*, and nine species of the tree are enumerated. *Kaduru* signifies "forbidden," and *Diwi* "tiger's." It thrives in a low situation with a light mixed soil, and is found near Colombo.

The flower of this extraordinary production is said to emit a fine scent; the colour of the fruit, which hangs from the branches in a very peculiar and striking manner, is very beautiful, being orange on the outside, and a deep crimson within; the fruit itself presenting the singular appearance of having had a piece bitten out of it. This circumstance, together with the fact of its being a deadly poison, led the Mohammedans, on their first discovery of Ceylon (which they assigned as the site of Paradise), to represent it as the "forbidden fruit" of the garden of Eden; for, although the finest and most tempting in appearance of any, it had been impressed, such was their idea, with the mark of Eve's having bitten it, to warn men from meddling with a substance possessing such noxious properties†.

The traditions which connect the history of our first parents with various localities, both in Ceylon and other eastern islands, are of such ancient date, that their origin becomes a subject of curious speculation. Adam is represented by the Moormen, or Mohammedans of Ceylon, on his expulsion from Paradise, to have lamented his offence, standing on one foot on the summit of the mountain which now bears his name; the figure of a foot is still to be traced there, but this, the Buddhists claim as a relic of their deity. Again, the reef of rocks connecting Ceylon with the island of Rámiseram, is usually called Adam's Bridge; but the Hindús, on the other hand, term it Rámá's bridge, representing their hero to have crossed it, when about to attack the giant Rávana in his strong-hold; and two large monuments, like Mohammedan tombs, on the island of Rámiseram, are represented by the Mohammedans to be the tombs of Cain and Abel. Many other instances might be adduced, but they may be more properly traced at another opportunity, with the aid of the additional information which Oriental scholars are so actively engaged in gathering for the illustration of ancient history.

† We find that these particulars were furnished by Sir. A. Johnston to Captain Grindlay, in illustration of a view of the cinnamon-garden from the back of Sir Alexander's house, published by Captain G. in his beautiful work on the scenery, architecture, &c., of Western India and Ceylon.

No one in his heart derides religion long. What are we—any of us? Religion will soon be our only care and friend.—PALEY.

No sound should be heard in the church but the healing voice of Christian charity. The cause of civil liberty and civil government gains as little as that of religion by confusion of duties. Those who quit their proper character, to assume what does not belong to them, are, for the greater part, ignorant both of the character they leave, and of the character they assume. Wholly unacquainted with the world in which they are so fond of meddling, and inexperienced in all its affairs, on which they pronounce with so much confidence, they have nothing of politics but the passions they excite. Surely the church is a place where one day's truce ought to be allowed to the dissensions and animosities of mankind.—BURKE.

ON HABITS.

CONSIDERING how deeply the principle of imitation is implanted in human nature, and how intimately it is connected with all that we say, or think, or do; and that the effect of this principle is to establish an undistinguishing rule of action, and an indolent subservience to custom, we need not be much surprised to find man, too frequently, the mere slave of habit.

From his earliest infancy, indeed, he is occupied, almost unconsciously, in forming a system of habits, by which his daily life is regulated, and on which, more or less, his future happiness or misery depends. It can scarcely, however, be supposed, that judgment or foresight have much, if any, part, in these first beginnings; and the result must mainly depend on the associations presented to the mind of each individual, and the character of those by whom he is surrounded. In maturer years, when this system comes to be submitted to the test of a strict examination, and to be reformed by the rule of experience, often dearly bought, a task is frequently to be commenced, which it requires all the courage of the most stout-hearted to engage in; and happy is he who, when he shall have detected the defects of the structure which has been thus almost imperceptibly raised, can set himself resolutely, and without hesitation, to pull down all that is unsightly, useless, or pernicious in its parts, even although the foundation itself is involved. Having formed his resolution, let him that instant set about the execution of it, and let him rest assured he will have occasion for all the energies he can bring to the task. If it be true that a freedom from error, and an honest reception of truth, constitute our happiness in this life, as well as our title to a better, it will follow that no sacrifice we can make in the pursuit of such an object can be too great; and if we proceed upon a well-grounded conviction that there is no *uncertainty* in the matter, it will also follow that the exertion must, in course of time, succeed.

But alas! We are too willing to put off the evil day, and while we are dallying with every trifle in our path, instead of resolutely girding ourselves up to the effort, time steals on, and life languishes, at best only a succession of failures which serve but more strongly to rivet our chain.

To say nothing of the acknowledged consequences of open and gross vice, how many a well-intentioned scheme do we not see frustrated by some circumstance which we readily impute to chance or accident, but which, if the truth were told, may be fairly traced to a weakness, an indecision, a want of something which we have long surrendered to the tyranny of habit, and which we have not the courage to reclaim. An undistinguishing submission to the customs of the world, a dread of its censure, and an acute sensibility of its applause; an indolent acceptance of the plausibilities of error, and an aversion to the investigation of abstract truth; are fetters which we are too willing to permit to be thrown around us, and under the constraint of which, many a good purpose languishes and dies. Yet, so satisfied are we with our bonds, so corrupt is our nature, so perversely indolent, yet so sensitively proud, there is no self-deception we would not practise, rather than encounter the evil, no error we would not fall into, rather than admit its existence.

I never think of this subject without recurring to the instructive story of *Obidah and the Hermit* in *The Rambler*. Obidah is described as setting forward on his journey through the plains of Indostan; his senses are regaled by all that could delight or

amuse him, and forgetting the toils of his journey, he steadily pursues his path till the sun reaches its meridian height. At a little distance from the high road he espies a shady-grove, which offers a tempting invitation to screen him from the glare of the mid-day sun; he enters, and, enchanted with the spot, strolls incalculably on, amusing himself with plucking flowers and listening to the sound of birds. In these amusements his hours pass away unnoticed; having wandered from the direct path, he knew not which way to travel, and he stood pensive and confused, afraid to go forward lest he should go wrong, and yet conscious that his time for loitering had long since expired. The day draws to a close. A storm comes on, and, seeking for shelter, he arrives unexpectedly at the cell of a Hermit; his story is told, and the hermit takes occasion to read him an instructive lesson, which it will be well for us all to ponder and apply to ourselves.

"Human life," says he, "is the journey of a day; temptation succeeds to temptation, and one compliance prepares the way for another; we lose in time the happiness of innocence, and we solace our disquiet with sensual gratifications. We entangle ourselves in business, immerse ourselves in luxury, and rove through the labyrinth of inconstancy, till the darkness of old age begins to invade us, and disease and anxiety obstruct our way. We then look back on our lives with horror, grief, and repentance, and wish, too often vainly wish, we had not forsaken the ways of virtue and happiness."

"Happy are they who shall learn from thy example not to despair, but shall remember that though the day is past, and their strength wasted, there yet remains one effort to be made; that reformation is never hopeless, nor sincere endeavours ever unassisted; that the wanderer may at length return after all his errors, and that he who implores strength and courage from above, shall find dangers and difficulties give way before him."

H.

THE COMMON BEE.

THE COMMON BEE, or HONEY-FLY, is an insect of the species of the fly with four wings. This fly is of the number of those who live in association. Man has subjected them to his dominion, in order to profit by their labour; and he has assembled them in kinds of baskets, or boxes, called hives, which vary in form and size in different countries.

The Bees live in a state of society; the individuals of a hive are perfectly known to each other, and they never admit a stranger into their community, excepting accidentally at swarming-time, when circumstances can so combine, that several swarms may unite and form a social brotherhood. Every society is a monarchy governed by a queen, subordinate to whom are several hundred drones, and a multitude of labourers, according to the size of the colony. It is of the latter that we are giving an account.

These insects are called common, because they, in fact, compose the community of the hive, of which the drones only form a part during a short period of time. They are also called Working Bees, because they alone bring provisions into the hive, construct the combs, nourish the brood, defend the monarchy; in one word, because they perform all the labour useful to the community.

Some authors maintain that, in the monarchy of the Bees, a regularity and an admirable subordination are to be observed; that a well-regulated distribution of employment is remarked, as well as perfect order and concert, which must result from minds

conspiring to the execution of the same plan ; but that which in men would be the effect of reason, correspondence, or co-operation, is in the Bees but the effect of that instinct which is implanted in them by the great Creator.

We are acquainted in England but with one sort of Bees, although the foreign naturalists mention three, and some even four ; but this latter kind is very rare, and has not yet been naturalized.

It is to this small, but wonderful insect, that we are indebted for all the honey and wax which form a part of our domestic and commercial relations. When we consider that the former is amassed from those small, and to us almost imperceptible, globules which are found either in the chalice of the flowers, or exude from the trees, we cannot be sufficiently impressed with admiration at the perseverance and labour of the Bee. It appears to labour less for the preservation of its own existence, than for that of its species, and the prosperity of its populous state ! The days on which the honey abounds in the flowers, and on the leaves of certain trees, the Bee is observed to be uncommonly industrious, entering and leaving the hive with wonderful rapidity. The office of collecting the farina from the plants is not, however, neglected ; and it is very easy to discriminate between the Bee which has been collecting honey, and that which has been collecting only farina. The shape of the former is cylindrical, that of the latter oval.

In regard to the physical description of the Bee, the most remarkable parts of it are the head, the breast, and the belly. On the former are observed two *rete mirabile* eyes placed in the side, two *antennae*, two hard teeth or jaws, which play, on opening or shutting, from the left to the right. These teeth enable it to collect the wax, to knead it, to construct the cells, and to remove from the hive every obnoxious thing.

Below these two teeth we observe a proboscis, which has the appearance of a thick fleshy substance, of a very shining and chesnut colour. This substance is divided into two parts, very supple at the end, and it is only seen at its full length when the Bee is employed in collecting honey, or sipping water. This proboscis is a most wonderful machine. To the simple view, it appears enveloped with four kinds of scales, which form together a channel by which the honey is conveyed. The proboscis, which is in this channel, is a muscular body, which, by means of its muscular motions, makes the honey ascend into the gullet. If the teeth be separated, we observe, at the orifice of the proboscis, an opening, which is the mouth, and above it a fleshy substance, which is the tongue. The breast is attached to the head by a very short neck ; it carries four wings on it, the two last of which are longer than the other. It has six feet, on the two hinder of which are two triangular cavities, in which the Bee, by degrees, collects the particles of farina from the plants. At the extremity of the six feet are two sorts of fangs, with which the Bees attach themselves to the sides of the hive, and to each other. From the middle of these fangs, on the four hinder legs, project four bushy substances, the use of which is to collect the dust of the flowers attached to the hair of their body. These brushes have the same use as hands.

The body, properly so called, or the belly, is united to the breast by a species of thread, and is composed of six scaly rings. The whole body of the Bee appears, even to the naked eye, to be well clothed. Age makes a little difference in them, in point of colour ; those of the present year are brown, and have greyish

hair ; those of the preceding year have reddish hair, and the scales less brown, rather inclining to black ; their wings are also often torn and fringed at the ends, by their former flights. On the breast, and on the wings of the body, are observed small orifices or pores, in the shape of a mouth, by which the Bee respires ; these are the lungs, and they are technically called *stygmates* ; this part, which is of a wonderful construction, is common to them, as to all other insects.

The interior of the belly consists of four parts,—the intestines, the honey-bag, the venom-vessel, and the sting. The intestines serve for the digestion of their food. The honey-bag, when it is filled, is as large as a small pea, transparent as crystal, and contains the honey which the Bees have collected from the flowers, and which is disgorged into the cells to nourish the hive during the winter. That which is destined for their own nourishment never enters into it, but passes through the viscera destined to the purpose of digestion. The vessel which contains the venom is at the root of the sting, along which the Bee ejects some globules, as along a tube, in order to spread into the wound. The sting is situated at the extremity of the belly of the Bee ; it is about two lines in length, and enters with great rapidity, by means of certain muscles which are placed very near the sting, and which are very perceptible on squeezing the hinder part of the Bee ; its extremity is barbed, the teeth of which are turned in the direction of an arrow, which enter with facility, and cannot be extracted without causing a laceration. The wound which the Bee makes is almost always fatal to it ; when it wishes to withdraw its sting, it remains in the wound, and with it the Bee loses the vessel of venom, which is at the root of the sting, and the ligaments to which it is attached. The Bee thus wounded cannot live a long time ; it perishes, after having made war, in the manner of the savages, with poisoned arrows.

These details can only produce, in every rational man, a more distinct and extensive knowledge of that infinite intelligence, which has arranged the creatures of this earth, presided at their organization, and regulated their existence and configuration. There is nothing in nature which can so forcibly demonstrate to us an equally wise and powerful Author. The insects the most vile are, perhaps, more admirable in their construction than the sun and the most brilliant stars. What proportion ! what harmony ! what correspondence, in every part of the Bee ! How many combinations, arrangements, causes, effects, and principles, which tend to the same end, and concur in the same design ! What exactness, what symmetry in its little body, apparently contemptible, and so little admired by ignorant and inattentive persons ! As in the greater number of animals, so we observe in the Bee, vessels without number, liquids, motions often united in an imperceptible point,—all the organs of life, the instruments of labour, the means of escaping from their enemies, weapons to command victory, and a thousand beauties which adorn its exterior form !

Every thing in these insects announces that supreme wisdom which presided at the formation of a work, so perfect, so industrious, so superior to every thing which art could ever produce. Every thing here is for our use and benefit. The Bees, in fact, make use of their wondrous qualities only for our good. It is for us that they work ; and it is towards Him, therefore, who has given to them these inclinations, that we ought to express our love and gratitude.—*Huish on Bees.*

HENRY PRINCE OF WALES; ELDEST SON OF KING JAMES THE FIRST



PRINCE HENRY, SON OF JAMES THE FIRST.

THERE are few events recorded in the history of England, which the generality of readers, the young especially, peruse with so much interest as the early death of illustrious and promising characters. The pen of the impartial historian dwells with delight on those traits of disposition, which gave rise to the fairest hopes; and imparts to the reader emotions of sorrow and regret, at the premature close of a life, dear to thousands. It is not in a political point of view, however, that a great national loss is *thus* felt. Honour, love, and esteem for the individual character, must be the spring of such affections,—pensive indeed, yet mingled with pleasure, that so sweet a plant was removed to a kindlier soil, before the rude breath of the world had disturbed or corrupted it; and that one of lofty station left a pattern, which in its leading points, all, however lowly in their walk of life, may follow, and be happy.

Deep and universal was the grief which pervaded the nation, on the decease of the young prince, whose likeness appears at the head of this paper. Born to high expectations, and surrounded by busy flatterers, HENRY, PRINCE OF WALES, had established a name for piety, temperance, prudence, and many manly virtues, when he was snatched away in the very spring-time of existence! Yet he had the happiness to die in the height of favour with men, as well as, we hope, with God, and without experiencing the miseries which awaited the royal family. Of his high qualities and exemplary behaviour, several authentic documents exist; and the scattered intelligence concerning him, appears well worthy of collection for our Magazine.

HENRY, eldest son of King James the First, and Queen Anne of Denmark, was born in Scotland, early in 1594. After remaining under the care of the Earl of Mar, he was placed, at five years of age, with an excellent tutor, by whose instructions he made a great and rapid progress in learning; the energies of the body keeping pace with those of the mind. At the age of nine he began to acquire a fondness for riding, dancing, shooting, and tossing the lance, exercises in which he afterwards greatly excelled; and before he reached the age of ten, he was installed at Windsor, a knight of the garter. On the 4th of June, 1610, he was created Prince of Wales, at Westminster, with solemn and magnificent ceremonies, the eyes of the people being fixed upon him as their future sovereign.

It was now that he became most popular among all classes. In the government of his affairs, he set a noble example of mingled liberality and economy, providing plentifully, but knowing and watching his expenses; and though with a retinue of little less than five hundred persons, many of them young gentlemen of high expectations, he left his revenue increased some thousands a year. An original manuscript, containing orders made by this young prince, respecting his household, as given at Richmond in 1610, was communicated some years ago to the Royal Society. The first order is; "That when I am at divine service in my private closet, my gentlemen in ordinary be warned to attend me, and be present at times of prayer; and to do the like when I go to my public chapel to service and sermons: wherein I will dispense with no man; holding him

unfit to serve me, that with me will forbear to go to hear the word of God; which example of liberty shall never be tolerated in my court, nor made a reason to encourage others in like disobedience and contempt towards religion."

After a series of general regulations concerning his own and his household's living, he concludes, "As I began with the due divine service unto Almighty God, without which nothing can prosper nor yield comfort, either in this world or in the world to come; so do I conclude, that amongst other my ordinances, it be strictly looked unto and observed that, four times in the year, namely, at Christmas, Easter, Midsummer, and Michaelmas, all my ordinary servants, without exception, do receive the Communion at my public chapel; and that before the receiving of the communion, one of my chaplains, or some other good preacher, do make a sermon, or read a lecture, tending to instruct men to the reverent and worthy receiving of that holy and blessed Sacrament. And of such as shall either wilfully refuse so to do, or cautiously absent themselves of purpose, I desire that myself be informed, to give such further order therein, as may stand for an eminent example and chastisement to such ungodly and unchristian-like disposition: for the which kind of people, my court shall be no shelter, nor my service any protection."

He had an esteem for the brave and unfortunate Sir Walter Raleigh, during whose sad imprisonment, the prince used to say, *Sure no king but my father would keep such a bird in a cage!* In an interesting letter of advice to the prince, from Sir Walter, dated August, 1611, among other excellent passages we find these: "Consider the inexpressible advantage which will ever attend your Highness, while you make the power of rendering men happy, the measure of your actions. While this is your impulse, how easily will that power be extended! The glance of your eye will give gladness, and your very sentence have a force of bounty." And his royal father, who, it is asserted, sometimes felt himself outdone by the splendour of the prince's reputation, addressed to him the following powerful lines.

FROM KING JAMES TO PRINCE HENRY.

God gives not kings the style of Gods in vain,
For on His throne his sceptre do they sway:
And as their subjects ought them to obey
So kings should fear and serve their God again.

If then ye would enjoy a happy reign,
Observe the statutes of our heavenly King:
And from his law make all your laws to spring;
Since his lieutenant here should ye remain.
Reward the just; be steadfast, true and plain;
Repress the proud, maintaining aye the right;
Walk always so, as ever in His sight,
Whq guards the godly, plaguing the profane.

In 1612, a marriage was proposed for him with a daughter of Henry the Fourth of France. But, though not at once rejecting, he never appeared desirous to encourage this union, on account of the princess's creed, she being a Roman Catholic: and it is stated that "in his sickness afterwards, he applied this chastisement for a deserved punishment upon him, for having ever opened his ears to admit treaty of a popish match." In October, the same year, he was seized with an illness, the nature of which was not thoroughly understood; and he died, deeply lamented, on the 6th of November, 1612*.

* It is remarkable, that another rising Hope of England, the Princess Charlotte, was snatched away in the same month, and on the same day of the month. She died November 6, 1817.

An opinion prevailed at the time, that he was carried off by poison; a presumption not to be wondered at, nor indeed, perhaps, groundless, when we consider his honest and avowed dislike to the wretched court-minion Car, Lord Rochester, afterwards Earl of Somerset, as well as to the Howards, with an infamous branch of which family Car had united himself by marriage.

"HENRY," says Birch, in his *Lives of Illustrious Persons*, "was about five feet eight inches tall; of a strong and handsome frame, an amiable countenance, his hair auburn, and his eyes fine and piercing. He was sober, chaste, temperate, religious. He was never heard to swear, though the example of his father, and of the whole court, was but too apt to corrupt him in that respect. He took great delight in the conversation of men of honour; and those who were not reckoned such, were treated with no attention at his court. He was naturally gentle and affable; though he had a noble stateliness without affectation, which commanded esteem and respect. He showed a warlike taste in his passionate fondness for martial exercises. A French ambassador coming to take leave of him, found him tossing a pike; and asked him whether he had any commands to France: 'Tell your master,' said the prince, 'how you left me engaged.' He was eighteen years old when he died; and no historian has cast the least stain upon his character."

Sir Charles Cornwallis, treasurer of Henry's household, thus concludes an account of him; "God seeing it good to bestow another Crown upon him, excelling all that on earth was to be had or hoped: after some five days' sickness, endured with patience, and as often recognition of his faith, his hopes, and his appeals to God's mercy, as his infirmity, which affected him altogether in his head, would possibly permit; he yielded up the ghost at St. James's, next Westminster, and was interred at Westminster, where his body now resteth." M.

As rivers, when they overflow, drown those grounds, and ruin those husbandmen, which, whilst they flowed calmly betwixt their banks, they fertilized and enriched; so our passions, when they grow exorbitant and unruly, destroy those virtues, to which they may be very serviceable whilst they keep within their bounds.—BOYLE.

It is useful to observe, in our progress through life, the chain of duties, trials, and blessings, which imperceptibly conduct us from one period to another; and how successive comforts and blessings spring from previous duties. Thus the diligence, sobriety, and virtuous habits of youth, will, in middle age, ensure to us, through God's blessing, the respect of the world, and success in our pursuits, and the active and useful employments of that period, added to early and continued piety and benevolence, will produce an old age of comfort and consolation. Thus proceeding in the way we should go, we reap, from the same source, our reward for the past, and our encouragement for the future

MRS. KING.

In this world we are children standing on the bank of a mighty river. Casting our eyes upward and downward, along the channel, we discern various windings of its current; and perceive that it is now visible, now obscure, and now entirely hidden from our view. But being far removed from the fountain whence it springs, and from the ocean into which it is emptied, we are unable to form any conceptions of the beauty, usefulness, or grandeur of its progress. Lost in perplexity and ignorance, we gaze, wonder, and despond. In this situation, a messenger from heaven comes to our relief, with authentic information of its nature, its course, and its end; conducts us backward to the fountain, and leads us forward to the ocean. This river is the earthly system of providence: the Bible is the celestial messenger: and Heaven is the ocean in which all preceding dispensations find their end.—DWIGHT.

THE DAISY IN INDIA.

THRIE welcome, little English Flower!
My mother-country's white and red,
In rose or lily, till this hour,
Never to me such beauty spread:
Transplanted from thine island-bed,
A treasure in a grain of earth,
Strange as a spirit from the dead,
Thine embryo sprang to birth.

Thrice welcome, little English Flower!
Whose tribes beneath our natal skies
Shut close their leaves while vapours lower;
But, when the Sun's gay beams arise,
With unabash'd but modest eyes
Follow his motion to the west,
Nor cease to gaze till daylight dies,
Then fold themselves to rest.

Thrice welcome, little English Flower!
To this resplendent hemisphere.
Where Flora's giant-offspring tower
In gorgeous liveries all the year:
Thou, only Thou, are *little* here,
Like worth unfriended or unknown,
Yet to my British heart more dear
Than all the torrid zone.

Thrice welcome, little English Flower!
Of early scenes beloved by me,
While happy in my father's bower,
Thou shalt the blithe memorial be;
The fairy sports of infancy,
Youth's golden age, and manhood's prime,
Home, country, kindred, friends—with thee
Are mine in this fair clime.

Thrice welcome, little English Flower!
I'll rear thee with a trembling hand:
O! for the April sun and shower,
The sweet May-dews of that fair land,
Where Daisies, thick as starlight, stand
In every walk!—that here might shoot
Thy scions, and thy buds expand,
An hundred from one root!

Thrice welcome, little English Flower!
To me the pledge of Hope unseen;
When sorrow would my soul o'erpower
For joys that *were*, or *might have been*,
I'll call to mind, how—fresh and green,
I saw thee rising from the dust,
Then turn to heaven with brow serene,
And place in God my trust.

FAMILIAR ILLUSTRATIONS OF EXPERIMENTAL SCIENCE.

No. IV. HEAT. TEMPERATURE. RADIATION. CONDUCTION.

In the present state of our knowledge, it is impossible to determine whether heat should be regarded as a substance, endowed with extraordinary powers, by which it penetrates and diffuses itself among the particles of every other element; or as a quality, inseparable from matter, and dependent on certain conditions for those unceasing fluctuations which constitute its most remarkable phenomena.

The resistless energies of this omnipotent and all-pervading agent are in constant operation. There is not an instant of time that heat is not performing some important duty in fulfilment of the Divine purposes. Among all the works of God, we know of none on which the evidences of design are more conspicuously inscribed.

Whatever may be the nature of heat, be it a peculiar *substance*, or a peculiar *property*, we know that it exists. To its influence we are indebted for the due performance of all the functions of life, for all that cheers the eye, delights the ear, and gratifies the taste. Nor is it to heat only, but to its being supplied to us in its due proportions, that we owe so

much. Its excess, or its deficiency, would be equally fatal to vegetable and animal existence. In one case, the earth would become a parched desert, in the other, an ice-bound plain.

It is important that we should distinguish between heat itself, and the sensation of heat. The first is a cause, the second its effect. With a view to prevent mistakes, by the frequent interchange of terms, meaning sometimes one thing, and at other times another, the term *caloric* is now extensively employed by scientific writers, to denote that condition of bodies, by which the sensation of heat is produced, or, in other words, to define the cause of heat, as distinct from its effects. Wishing to refrain, as much as possible, from scientific phraseology, we shall restrict ourselves to the ordinary term (heat), requesting our readers to remember that, unless the contrary is distinctly stated, it always means heat, as an element, residing in, or operating upon, matter, without any regard to our feelings.

By the continual use of the terms *heat* and *cold*, in the affairs of common life, we sometimes employ the latter term, as if it was descriptive of an element, or agent, equally energetic in its effects as any other with which we are acquainted, but whose properties are directly the opposite of those possessed by heat. Cold is only the absence of heat. It is easier, and, because we are accustomed to it, more natural to say, "It is cold," than it is to describe that condition by saying, "There is a deficiency of heat." The latter, however, is a correct definition. We know by experience, that the gradual abstraction of heat from a body, which at first may possess so much of it as to be unapproachable, induces the sensation we denominate cold. But cold is only a relative term. We know nothing of matter where heat is not present. There is less heat in one substance than in another; but of absolute cold we have no conception.

Temperature is a term that will very often occur whilst treating of the properties of heat. We think it right at once to explain its signification. The temperature of a body means its *sensible heat*, that is, the heat of which some estimate may be formed by a thermometer*, a useful instrument, that we shall describe particularly hereafter. In comparing two different substances, or two distinct parts of the same substance, if we find the first communicates to the thermometer more heat than the second, we say the temperature of the former is *higher* than that of the latter, or, that the temperature of the latter is *lower* than that of the former. Higher and lower, as applied to temperature, are terms that evidently owe their origin to the operation of the thermometer; since the smaller the quantity of sensible heat present in any substance with which the bulb of a thermometer is placed in contact, the lower will the column of mercury, or other fluid within the tube, descend; the greater the quantity of sensible heat, the higher will it rise. The sensible, or as it is commonly termed, *free* heat, thus discoverable in any particular substance by the aid of a thermometer, must be viewed, as entirely independent of the heat which permanently resides in that substance, or which may be temporarily combined with it in a *latent*, that is, a concealed state. We may satisfy ourselves, that a vast quantity of heat has entered into some particular substance, but we can neither detect the presence, nor estimate the quantity, of that which is *latent*, by our ordinary perceptions, nor through the agency of a thermometer.

Heat is communicable from one substance to

* The thermometer obtains its name from two Greek words, *therme*, heat, and *metron*, a measure.

another by *radiation* and by *conduction*. Radiation takes place between bodies whose temperatures are unequal, at sensible distances. Contact is a condition essential to conduction.

If a piece of heated metal be fixed in the centre of a room, midway between the ceiling and the floor, heat will be disengaged from it equally in all directions, upwards, downwards, horizontally, and obliquely, which may be proved by the melting of a small quantity of tallow placed at certain distances around the metal. This is an instance of radiation. When the bowl of a metal spoon is left, for a few minutes, in a cup of hot tea, the handle of the spoon acquires the same temperature as that of the tea. Here we have an instance of conduction. In one case, the heat separated from the metal will affect the tallow at some distance, passing readily through, or among, the particles of the intervening air. In the other case, the heat first communicating with that part of the spoon in contact with the tea, it is, if we may employ the expression, pushed forward from particle to particle of the metal, along the handle, until it reaches its extremity.

As radiation and conduction commonly operate together, they may be considered as different parts, or rather, different forms, of the same process; both equally dependent on that property peculiar to heat, by which it tends to diffuse itself in every direction, and among the particles of every species of matter, whatever may be its form, size, colour, or quality. Thus, if any number of vessels, some constructed of metal, others of wood, others of stone, and others of glass, each vessel containing a liquid of a different kind and at a different temperature, be placed in the same room, the liquids and the vessels containing them will, in a few hours, all arrive at the same temperature, which will be that of the air in the room. The same would, of course, be the result, with solid or aëroform bodies, as with liquids.

Radiation and conduction may be further explained by considering the former as operating at the surfaces of bodies, whilst the latter goes on throughout their interior parts. The rate at which heat is radiated and conducted by any substance, depends very much on the nature of the materials of which that substance is composed. Radiation is also influenced in a remarkable degree by the colours and other conditions of the surfaces of bodies.

Those bodies into which heat enters with facility,

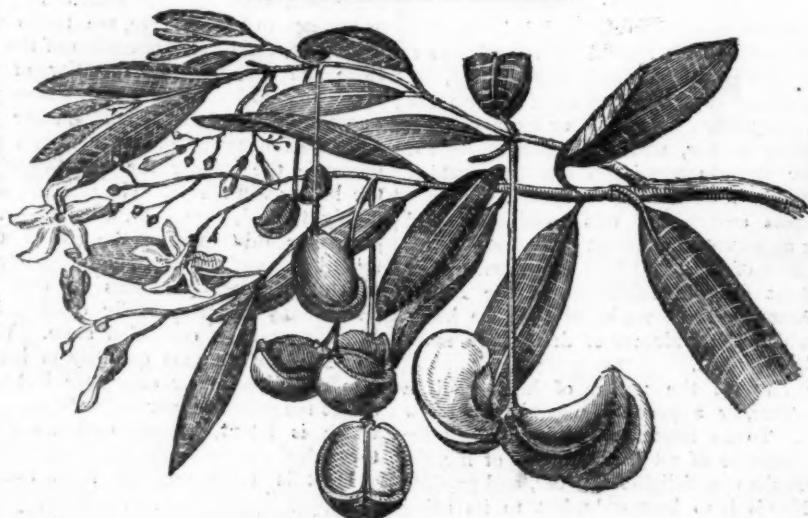
and among whose particles it is transmitted rapidly, are called *good conductors*. Those, on the contrary, which offer considerable resistance to the progress of heat among their particles, are termed *bad conductors*. The latter are frequently denominated *non-conductors*, a description not philosophically correct; since every substance with which we are acquainted will conduct heat, although in some its transmission is exceedingly slow.

Among good conductors the metals are the best; of these gold, platinum, silver, and copper, are nearly equal. The next in order are iron and zinc, then tin, and the slowest conductor of them all is lead. Wood, stone, and bricks, are among the bad conductors: of this class the most perfect are wool, hair, cotton, the fur of animals, the feathers of birds, and especially the down of the swan. Liquids and aëroform bodies, when there is no motion among their particles, are bad conductors of heat. If freedom of motion be established, they become good conductors.

In our next paper, we will endeavour to illustrate more fully the operation of Heat as respects conduction and radiation. We rather desire that our readers may complain of the brevity of our remarks, than that they should feel fatigued by our becoming tedious.

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THE energy of every function is regulated in a great measure by the quantity of blood which the organs exercising that function receive. The muscles employed in the most vigorous actions, are always found to receive the largest quantity of blood. It is commonly observed that the right fore-leg of quadrupeds, as well as the right arm in man, is stronger than the left; much of this superior strength is, no doubt, the result of education, the right arm being more habitually used than the left. But still the different mode in which the arteries are distributed to the two arms, constitutes a natural source of inequality. The artery supplying the right arm with blood, first arises from the aorta, and it proceeds in a more direct course from the heart than the artery of the left arm, which has its origin in common with the artery of that side of the head. Hence it has been inferred, that the right arm is originally better supplied with nourishment than the left. It may be alleged in confirmation of this view, that in birds, where any irregularity in the action of the two wings would have disturbed the regularity of flight, the aorta, when it has arrived at the centre of the chest, divides with perfect equality into two branches, so that both wings receive precisely the same quantity of blood, and the muscles, being thus equally nourished, preserve that equality of strength, which their function rigidly demands.—Dr. ROGET's *Bridgewater Treatise*.



FRUIT AND FLOWERS OF THE EVE'S APPLE. See p. 90.